Continuous Distributions

1. Uniform Distribution. $X \sim \text{Unif}[c, d]$.

$$f(x) = \frac{1}{d-c} \qquad (c \le x \le d)$$

a. Mean: $\mu = \frac{c+d}{2}$. **b.** Variance: $\sigma^2 = \frac{(d-c)^2}{12}$.

Example: Too much cholesterol in the blood increases the risk of heart disease. Young women are generally less afflicted with high cholesterol than other groups. The cholesterol levels of women aged 20 to 34 follow an approximately uniform distribution from 120 mg/dl to 250 mg/dl.

a. What percent of young women have cholesterol levels below 245 mg/dl? Sketch an appropriate density curve and shade the area under the curve that corresponds to this question.

b. What percent of young women have cholesterol levels above 245 mg/dl? Sketch an appropriate density curve and shade the area under the curve that corresponds to this question.

c. What percent of young women have cholesterol levels between 210 and 245 mg/dl? Sketch an appropriate density curve and shade the area under the curve that corresponds to this question.

d. If 220 mg/dl is the threshold cholesterol level, what is the probability that a randomly selected young woman has a cholesterol level that is higher than this threshold value?

Homework: (Due on March 5, 2008) Section 5.2: (pp. 241-243) # 4, 5, 6, 9, 13, 14. **2. Normal Distribution**. $X \sim N(\mu, \sigma^2)$. The mean is μ and the variance is σ^2 .

$$f(x) = \frac{1}{\sqrt{2\pi\sigma}} e^{-\frac{1}{2\sigma^2}(x-\mu)^2} \qquad (-\infty < x < \infty)$$

Example: Too much cholesterol in the blood increases the risk of heart disease. Young women are generally less afflicted with high cholesterol than other groups. The cholesterol levels of women aged 20 to 34 follow an approximately normal distribution with mean 185 milligrams per deciliter (mg/dl) and standard deviation 39 mg/dl.

a. What percent of young women have cholesterol levels below 245 mg/dl? Sketch an appropriate normal curve and shade the area under the curve that corresponds to this question.

b. What percent of young women have cholesterol levels above 245 mg/dl? Sketch an appropriate normal curve and shade the area under the curve that corresponds to this question.

c. What percent of young women have cholesterol levels between 210 and 245 mg/dl? Sketch an appropriate normal curve and shade the area under the curve that corresponds to this question.

d. If 220 mg/dl is the threshold cholesterol level, what is the probability that a randomly selected young woman has a cholesterol level that is higher than this threshold value?